

CLAIMS

What is claimed is:

1. A semiconductor package, comprising:
 - a substrate having an upper surface and a lower surface opposed to the upper surface;
 - a semiconductor chip having an active surface, a back surface opposed to the active surface and a plurality of bonding pads formed on the active surface;
 - a plurality of conductive devices, the conductive devices formed on the bonding pads and electrically connecting the active surface of the semiconductor chip and the upper surface of the substrate; and
 - a thermal enhance layer formed on the back surface of the semiconductor chip.
2. The semiconductor package of claim 1, further comprising an underfill disposed between the active surface of the semiconductor chip and the upper surface of the substrate.
3. The semiconductor package of claim 1, wherein a material of the thermal enhance layer comprises thermally conductive polymer layer.
4. The semiconductor package of claim 3, wherein a material of the thermally conductive polymer layer comprises thermally conductive film.
5. The semiconductor package of claim 3, wherein a material of the thermally conductive polymer layer comprises thermally conductive epoxy.
6. The semiconductor package of claim 1, further comprising a heat spreader attached on the thermal enhance layer.
7. The semiconductor package of claim 6, wherein the heat spreader is a flat heat

spreader.

8. The semiconductor package of claim 6, wherein the spreader is a cap-like heat spreader.
9. The semiconductor package of claim 8; further comprising an adhesive connecting the substrate and the heat spreader.
10. The semiconductor package of claim 6, wherein a material of the heat spreader comprises copper.
11. The semiconductor package of claim 6, further comprising a stiffener ring connecting the substrate and the heat spreader.
12. The semiconductor package of claim 6, wherein the coefficient of the thermal expansion of the heat spreader is substantially the same as that of the semiconductor chip.
13. The semiconductor package of claim 6, wherein a material of the heat spreader comprises silicon.
14. The semiconductor package of claim 1, wherein the conductive devices are conductive bumps, and the active surface of the semiconductor chip faces and connects to the upper surface of the substrate via the conductive bumps.
15. The semiconductor package of claim 1, wherein the conductive devices are conductive wires, and the back surface of the semiconductor chip faces and connects to the upper surface of the substrate via the thermal enhance layer.
16. The semiconductor package of claim 1, wherein the substrate has an opening and the semiconductor chip is disposed in the opening.
17. The semiconductor package of claim 1, further comprising a plurality of solder

balls formed on the lower surface of the substrate.

18. The semiconductor package of claim 1, further comprising an additional semiconductor chip attached on the lower surface of the substrate.

19. A semiconductor package manufacturing method, comprising:

providing a wafer having an active surface and a back surface, wherein the active surface has a plurality of bonding pads and a plurality of bumps formed on the bonding pads, and the back surface has a thermally conductive polymer layer formed thereon;

providing a substrate having an upper surface and a lower surface;

attaching the active surface of the wafer onto the upper surface of the substrate via the bumps;

singulating the wafer, the thermally conductive polymer layer and the substrate simultaneously to form a plurality of semiconductor packages, each semiconductor package having an substrate unit and a semiconductor chip; and

forming a plurality of balls on each of the substrate units.

20. The semiconductor package manufacturing method of claim 19, further comprising disposing an underfill between one of the semiconductor chips and one of the substrate units.

21. The semiconductor package manufacturing method of claim 19, wherein the thermally conductive polymer layer is a thermally conductive film.

22. A semiconductor wafer structure, comprising:

a semiconductor wafer having an active surface, a back surface opposed to the active surface and a plurality of bonding pads formed on the active surface ;

a plurality of conductive devices formed on the bonding pads; and

a polymer layer formed on the back surface of the semiconductor wafer.

23. The semiconductor wafer structure of claim 22, wherein a material of the polymer layer comprises thermally conductive polymer.
24. The semiconductor wafer structure of claim 23 wherein a material of the thermally conductive polymer layer comprises thermally conductive film.
25. The semiconductor wafer structure of claim 23, wherein a material of the thermally conductive polymer layer comprises thermally conductive epoxy.
26. The semiconductor wafer structure of claim 23, wherein the thermally conductive polymer layer has metal powder formed therein.
27. The semiconductor wafer structure of claim 23, wherein the thermally conductive polymer layer has thermally conductive powder formed therein.